



## Early Journal Content on JSTOR, Free to Anyone in the World

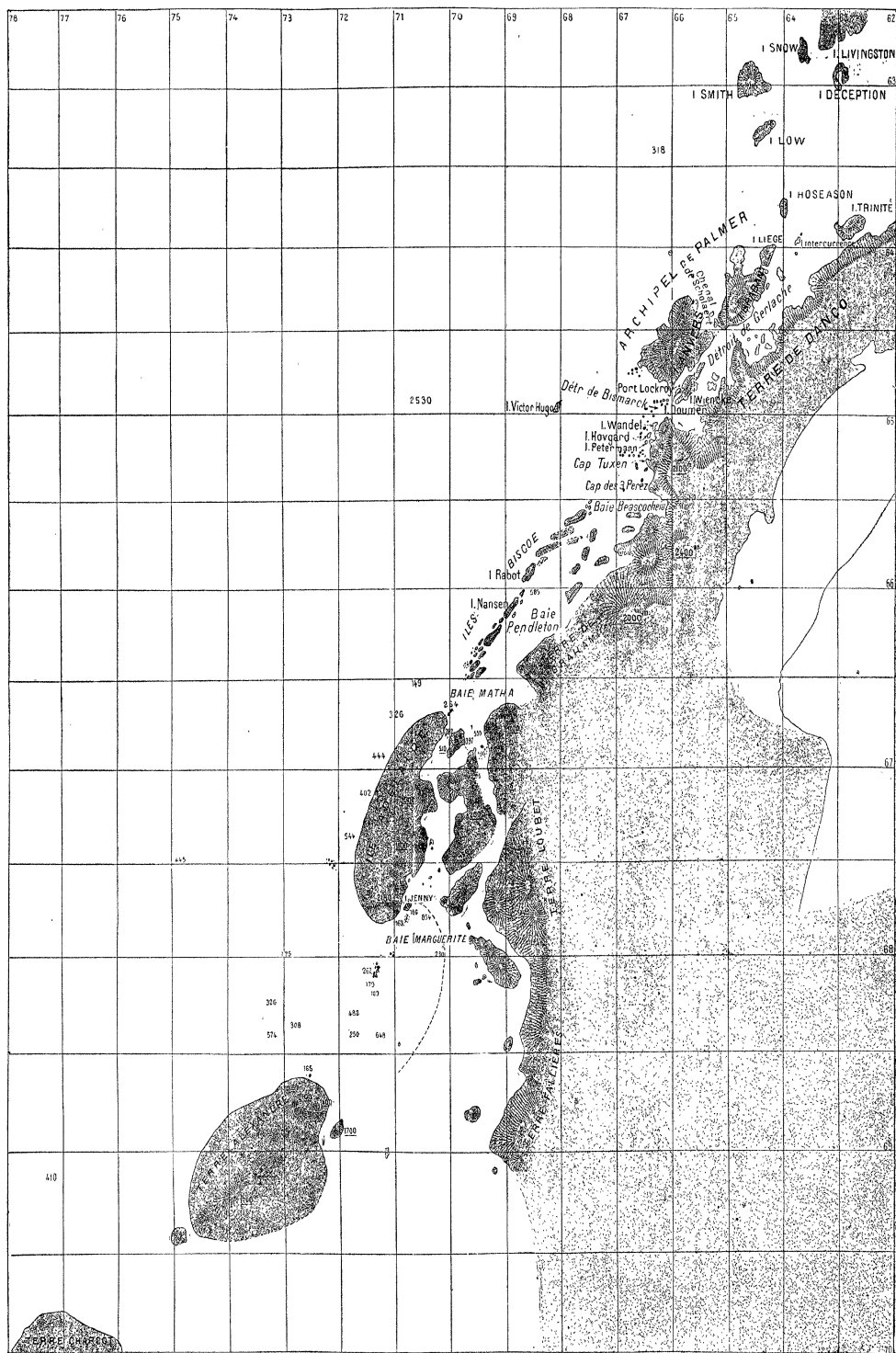
This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).



CARTE PROVISOIRE DE L'ANTARCTIQUE SUD-AMÉRICAINE

D'APRÈS LE LEVE FAIT PAR M. BONGRAIN

FIG. 1.

BULLETIN  
OF THE  
AMERICAN GEOGRAPHICAL SOCIETY

---

**Vol. XLIII**

**1911**

**No. 2**

---

CHARCOT'S ANTARCTIC EXPLORATIONS\*

BY

EDWIN SWIFT BALCH

Dr. Jean B. Charcot, in the years 1903-1904-1905, and 1908-1909-1910, organized and led to West Antarctica two French expeditions which obtained many important geographic and scientific results. The accounts which he has published of these two expeditions are delightfully written, profusely illustrated, and are probably the most distinctly literary works extant about the South Polar regions.

Charcot's first expedition was financed with the greatest difficulty. Only \$90,000 were raised, with which Charcot not only had to equip his expedition, but build a ship. The result was that not only was the *Français*, built at Saint Malo, very small, but her engines were much too weak. The scientific staff consisted of naval lieutenant A. Matha, naval ensign J. Rey, Dr. J. Turquet, Mons. E. Gourdon and Mons. P. Pléneau. They set sail from France at the end of August, 1903; from Buenos Aires, Dec. 23, and from Orange Bay, Jan. 27, 1904.

On Feb. 1, 1904, the expedition sighted Smith's Island, then it sailed past Low and Hoseason Islands, and coasted along the west shores of Liège, Brabant and Anvers Islands, arriving at the southern entrance of Gerlache Strait on Feb. 6. There were many tabu-

---

\* *Le Français au Pôle Sud*. Journal de l'expédition Antarctique Française, 1903-1905. Paris, Ernest Flammarion, (1906).

*Le Pourquoi Pas? dans l'Antarctique*. Journal de la deuxième expédition au Pôle Sud, 1908-1910. Paris, Ernest Flammarion (1910).

The map reproduced with this article is drawn in degrees of longitude west of Paris. This map and the pictures here used are taken from Dr. Charcot's book, *Le Pourquoi Pas?*

lar icebergs there. The next day they tied up in Flanders Bay for ten days, to fix up the bad engines. On Feb. 19, they sailed to Wiencke Island, where they found good anchorage in a small bay they named Port Lockroy. On Feb. 21, they arrived at Wandel Island, which they renamed temporarily Booth Island, where they found another good harbor. On Feb. 25, they sailed southwest, forcing their way through dense pack. On Feb. 26 and 27, they were off the Biscoe Islands in about  $66^{\circ}$  S. lat., where they could see the coast of Graham Land extending southward without any apparent break. The pack was so thick, however, and the southern winter so near that Charcot decided to return north to the harbor on Wandel Island. They reached this bay on March 4, and called it Port Charcot, after the explorer's distinguished father.

In Port Charcot,  $65^{\circ} 5' \text{ S. lat.}$ , the *Français* stayed until Dec. 25, 1904. She was anchored in a small bight in the harbor, and some yards and topmasts were fixed with a chain to seaward to prevent pack ice from jamming in on her. This novel artificial barrier worked well. The Antarctic winter was spent mainly in scientific observations of many kinds. A small hut was set up on the shore and many of the provisions were stored in it; and another small cabin was erected in which magnetic and meteorologic observations were carried out all winter. There was practically no suffering from the cold, the temperatures being much higher than might have been expected. The lowest were in July, 1904, the mean for the month being only  $-19^{\circ} 20' \text{ Cent.}$ ,\* with a minimum of  $-39^{\circ} \text{ Cent.}$ † Of course, there were many high winds, snow storms and heavy fogs, but the weather conditions were evidently less severe than those that Dr. Nordenskjöld experienced at Snow Hill. Lieutenant Matha had an attack of sickness during July similar to that of several other men who have wintered in the Antarctic. Charcot thinks this malady is possibly due to some "probable modification of the constitution of the atmosphere of these regions in winter."‡ Matha recovered in due time by sitting a certain number of hours a day undressed in front of a red hot stove, and by a liberal diet of condensed milk. As in other recent Antarctic expeditions, furs were worn but little; woolen clothing, with canvas coats and overalls to cut the wind and snow, proving sufficient protection. The French *déjeuner* and *dîner*, with soup, meat, vegetable and dessert each time, also proved most suitable in the Antarctic, and there never seems to have been any complaint, but, on the contrary, much praise, about

\* *Le Français*, etc., p. 351.

† *Le Français*, etc., p. 168.

‡ *Le Français*, etc., p. 181.

the food. The meat of seals and penguins formed the main staple of the table, and both were found good eating: this was doubtless due to their being in the hands of a good cook. Several kinds of rather small fish also furnished valuable fresh food. Seals and penguins were never killed for sport, and no writer, perhaps, has studied so carefully nor written so entertainingly of the habits of the penguin as Charcot.

Many short excursions were made during the winter in the neighborhood of Port Charcot on Wandel and Hovgaard Islands. Between Nov. 24 and Dec. 5, Charcot made a "raid" to the south. The party



FIG. 2—Pushing into the floe ice off Alexander I. Land.

took a boat, and partly by rowing, partly by dragging the boat over the ice, with great pluck and fatigue, reached a small island in about  $65^{\circ} 30'$  S. lat. They climbed to the summit, about 200 meters high, and, the day being perfectly clear, were able to see the coast of Graham Land as far as the Biscoe Islands in  $66^{\circ}$  S. lat.

During the month of December the ice gradually broke up round the *Franais*, and on Christmas day they were able to sail away from Port Charcot, reaching next day Port Lockroy on Wiencke Island, where they stayed till Jan. 4, 1905. Triangulations by Lieutenant

Matha showed the central peak on Anvers Island, which was christened "Mont du Français," to be 2,869 meters high. Thence they sailed up Gerlache Strait, then west up Schollaert Strait into Dallman Bay, and after some fairly careful map work, on Jan. 7, they sailed south. After a terrific storm they sighted land on Jan. 11, and closed in with it on Jan. 15. It was seen extending between about  $66^{\circ} 40'$  S. lat. and  $67^{\circ} 10'$  S. lat., and at the time was supposed to be part of the west coast of northern West Antarctica. It was christened "Loubet Land," but Charcot has since discovered that it was Adelaide Island. Unfortunately, just at the crucial moment, when new discoveries were imminent, the *Français* ran plumb on to a sunken rock. The explorers had been lulled into belief in the presence of deep water ahead, as within "one cable's length" of the reef was an iceberg fifty meters high. The *Français* stove in her bows so badly that immediate return was imperative. By dint of pumping steadily the ship was kept afloat, and, after the greatest hardships, faced with splendid pluck and endurance, the expedition was just able to reach Port Lockroy on Wiencke Island on Jan. 29.

On Wiencke Island, the Alpine guide Pierre Dayné and the seaman Jabet climbed the peak of the island, 1,500 meters high, which Charcot named after the Duke of the Abruzzi. After temporary repairs to the ship, they started on Feb. 12, and sailed up Gerlache Strait, visited in boats the north shores of Brabant Island, and then passing Hoseason, Low and Smith Islands, sailed through Lemaire Strait, and reached Puerto Madryn in Argentine on March 4, 1905.

Dr. Charcot's second expedition, on account of the success of the first expedition, was financed more readily and largely. A bigger and stronger vessel, the *Pourquoi Pas?* was built also at San Malo. Dr. Charcot's scientific staff this time consisted of naval ensign M. Bongrain, astronomy and hydrography; J. Rouch, naval ensign, meteorology; R. Godfroy, naval ensign, tides; Dr. E. Gourdon, geology and glaciology; Dr. J. Liouville, zoology; L. Gain, zoology; and A. Senouque, magnetism.

The *Pourquoi Pas?* left Havre on Aug. 15, 1908. After several stops, at Madeira, Rio Janeiro, Buenos Aires, etc., she sailed from Punta Arenas on Dec. 16, 1908. On Dec. 22, they reached Deception Island, a name Charcot thinks most inappropriate, which seems to be changing considerably and where Yankee Harbor is silting up. They found there several Norwegian steam whalers, among them the *Raun* and *Gobernador Bories*. On the latter was Mrs. Andresen, the wife of her commander Captain Andresen, and Mrs. Andresen is the first woman on record who has crossed the sixtieth parallel of

south latitude. A number of whalers now go to the Antarctic every year, and they will pretty soon thin out the southern whales, as was done formerly to the northern whales. The British government makes these whalers pay them an annual tribute;\* although, as England has never perfected by occupation any of her rights of discovery in the Antarctic, she has, according to international law, no legal sovereignty there†.

The *Pourquoi Pas?* started on Christmas day down Gerlache Strait, arriving on Dec. 29 at Wandel Island, where Charcot found numerous relics of his former wintering.

On Jan. 4, 1909, Charcot, Gourdon and Godfroy started for a day's boat excursion near Cape Tuxen. Caught in fog and bad ice, they were gone several days and in great danger. Almost imme-

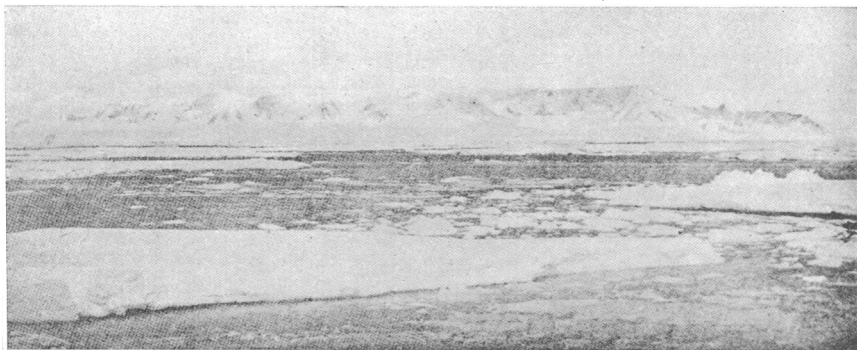


FIG. 3—Alexander I. Land.

diately on their return the *Pourquoi Pas?* ran on to a rock near Cape Tuxen and was only got afloat with the greatest difficulty.

On Jan. 12, they continued south. On Jan. 13, they sailed between Rabot Island and Nansen Island of the Biscoe Archipelago. Here, in about  $66^{\circ} 15'$  S. lat., they sighted a great bay which stretches far away into the mainland. This bay Charcot christened Pendleton Bay, as it about corresponds with the position of the bay J. N. Reynolds reported as discovered before the year 1828 by Benjamin Pendleton of Stonington, Conn. Charcot also asserts that the remarks about wind and weather in Reynolds' article prove that Pendleton had been in this region.

On Jan. 14, the *Pourquoi Pas?* arrived at the north end of Ade-

---

\* Le "*Pourquoi Pas?*" etc., p. 41.

† Thomas Willing Balch: "The Arctic and Antarctic Regions and the Law of Nations": *The American Journal of International Law*, April, 1910.

laide Island. The discoveries of the next few days showed that it is much larger than was supposed. The northerly entrance to the later discovered channel between Adelaide Island and the mainland was called Matha Bay. Sailing southward to the west of Adelaide Island on Jan. 15 the *Pourquoi Pas?* entered the southern end of the same channel, and this was christened Marguerite Bay. The name Loubet Land, which Charcot had erroneously applied on his first voyage to part of Adelaide Island, was afterwards transferred to the mainland within the same parallels. In Marguerite Bay a small island was discovered and called Jenny Island. From its top-most point no sight of Alexander Land was obtained at this time, but to the southeast the mainland of West Antarctica was seen stretching away indefinitely south. This hitherto unsighted portion of the coast was then called Fallières Land.

Sailing south again, on Jan. 16, the *Pourquoi Pas?* was off the north shore of Alexander Land. From this point Fallières Land could be seen stretching south beyond the 69th parallel. Alexander Land was seen here for the first time from the north, and it is almost certain now that it is an island. Good photographs were obtained of Alexander Land, a rocky mountainous land, of which Dr. Charcot found that Bellingshausen's and Arctowski's descriptions were most accurate.

They were unable to break through the pack towards Fallières Land, or towards the southwest, and therefore the *Pourquoi Pas?* sailed back to Marguerite Bay. Thence they turned south again and on Jan. 22 were once more off the northern extremity of Alexander Land. But no further southing was possible, and so on Jan 23, they returned to Marguerite Bay.

Here they stayed several days, and Bongrain, Gain and Boland made an excursion to the north which, in connection with some observations taken in Matha Bay, proved the existence of a strait between Adelaide Island and Loubet Land. This channel seems to be still unnamed and it might fittingly be christened Charcot Strait. A curious incident happened in Marguerite Bay. One day a penguin popped up on the pack, holding on to a big fish. Bongrain grabbed the fish, which turned out to be a new variety; but the poor penguin, expressing its feelings forcibly, followed Bongrain to the ship. Charcot would have liked to winter in Marguerite Bay, but no safe anchorage could be found. Therefore, on Jan. 30, the prow of the *Pourquoi Pas?* was once more turned northward. Matha Bay was revisited, the Biscoe Islands were coasted along, and the ship brought to rest in Port Circoncision, Petermann Island.



Preparations for wintering were begun immediately. The ship was carefully secured within the harbor, and a chain stretched in front of her to ward off danger from any icebergs. Everything was prepared as far as possible for comfort and scientific work. Cabins for meteorology, seismology, etc., were erected on the island and observations were kept up all through the winter.

The weather was cold, but never extremely so. The mean temperature for the year 1909 was  $-2.785^{\circ}$  C. The month of July was the coldest; with a mean temperature of  $-6.79^{\circ}$  C. The lowest recorded temperature was in July and was only  $-23.9^{\circ}$  C. ( $-11.02^{\circ}$  F.). On March 24, there was heavy rain, and umbrellas would have been invaluable to walkers. There were storms, of course; but the weather is evidently much less severe on the western than on the eastern shore of northern West Antarctica.

There was some sickness during the winter. It was undoubtedly a form of scurvy, which did not attack the gums, but mainly the legs, and which also developed weakness of the heart. It was due to certain kinds of canned foods, and was conquered by a diet of seal and penguin meat.

Fortunately, there were many penquins at Petermann Island. On the arrival there of the *Pourquoi Pas?* Gain captured a number of them and put rings of diverse colors on their legs, and on the return of the penguins after the cold weather, many of them still had these rings on, showing that these birds not only return regularly to the same rookeries, but to the same spots in the rookeries.

Between Sept. 18 and Oct. 2, 1909, one raid was carried out on the mainland by Gourdon, Gain and Senouque. The weather, however, was so stormy that not much was accomplished, the party advancing only about 25 kilometers from the ship. Here, at a height of about 1,100 meters, they found themselves in a great circular valley, surrounded with a rampart of mountains, over which they were unable to make their way. It is evident, however, that, owing to the mountainous nature of West Antarctica, any attempts to penetrate it on foot and with sledges south of Charcot Land and Fallières Land will be fraught with the greatest difficulties.

On Nov. 25, 1909, the *Pourquoi Pas?* left Petermann Island. Sailing north through Gerlache Strait, they reached Deception Island on Nov. 27, and found several Chilean and Norwegian ships there, among them the *Gobernador Bories*, with Captain and Mrs. Andersen aboard, from which Charcot was enabled to replenish his coal supply.

The *Pourquoi Pas?* was found to be badly injured forward, prob-

ably as the result of her grounding off Cape Tuxen. Temporary repairs, however, were effected at Deception Island with the assistance of the Norwegian whalers, and between Dec. 23 and Dec. 31 a short cruise was made to the eastward. Heavy pack prevented any approach to Palmer Land, but they landed, probably the first time on record, on Bridgman Island, and they were able also to corroborate Dumont D'Urville and Nordenskjöld as to the non-existence of Middle Island.

On Jan. 6, 1910, the *Pourquoi Pas?* left once more Deception Island. Keeping well out at sea, she sailed southwest and south down the west coast of northern West Antarctica. On Jan. 10, somewhere about 69° S. lat., bottom was struck at 455 meters. On Jan. 11, 1910, the *Pourquoi Pas?* charged through the pack between about 75° to 76° long. W. of Greenwich, to well beyond 69° S. lat. and at that point, from the crow's nest, Charcot himself was the first to sight a new coast. Two or three mountain summits rose from an ice cap extending far to the east and west along about the 70th parallel. This land is apparently entirely separate from Alexander Land, but Charcot is convinced he could distinguish, although he was not absolutely sure, several more mountain summits in the direction of Fallières Land. This new coast may therefore turn out to be part of the mainland of West Antarctica or another big island like Brabant or Adelaide Island. Heavy pack prevented any near approach to it or any advance towards Fallières Land. On the return of the expedition, apparently mainly at the suggestion of the writer of this review, this new land was called Charcot Land.

The *Pourquoi Pas?* now cruised westward, following in the main the 70th parallel. She kept as far south as the pack would permit. Up to 102° W. long. the track was in general from one to two degrees north of the track of de Gerlache and from one to two degrees south of that of Bellingshausen. Two soundings, the one of 3,030 meters in S. lat. 69° 10', W. long. 86.25°, the other of 4,350 meters in 69.20° S. lat., 99.49° W. long., show that this part of the cruise was outside of the continental shelf, over which de Gerlache undoubtedly drifted for some distance.

The *Pourquoi Pas?* passed close to the north of Peter I. Island, and Charcot was struck with the accuracy of Bellingshausen's description. A sounding of 1,400 meters, no bottom, within 6 miles, taken in connection with de Gerlache's sounding of 1,148 meters one degree and a half to the south, shows that Peter I. Island literally springs up right out of the ocean.

The cruise was continued always in about the same latitude. A

sounding in  $69^{\circ} 15' \text{ S. lat.}, 105^{\circ} 45' \text{ W. long.}$  gave 4,050 meters. Immediately after this the *Pourquoi Pas?* crossed the track of Capt. James Cook at the place where Cook made a dash due south, reached on Jan. 30, 1774,  $71^{\circ} 10' \text{ S. lat.}, 106^{\circ} 54' \text{ W. long.}$ , and then returned straight north again. Charcot thought he might himself have gone a little further south than Cook did at this spot, and that there is a sort of permanent bay or indentation in the ice. The great number of icebergs also led him to think that land is not far distant.

Beyond this, the cruise, still following in the main the 70th parallel to about the 122d meridian, was in a wholly unknown region. On Jan. 21, 1910, in  $70^{\circ} 5' \text{ S. lat.}, 118^{\circ} 50' \text{ W. long.}$ , a sounding of 1,040 meters was made. This is one of the most important of Charcot's discoveries. For it proves almost to a certainty that there is land about half way between Charcot Land and King Edward Land. It may be only one or more islands, but the indications are that it is the coast of West Antarctica, which, curving from Charcot Land to the southwest to perhaps  $75^{\circ} \text{ S. lat.}$ , between about  $80^{\circ}$  and  $110^{\circ} \text{ W. long.}$ , advances again to about  $70^{\circ} \text{ S. lat.}$  in about  $120^{\circ} \text{ W. long.}$

During this entire cruise, the *Pourquoi Pas?* kept as close to the pack as possible. Thick fogs, storms, and thousands of icebergs made the navigation exceedingly dangerous. Charcot thought that the pack and the icebergs between Peter I. Island and his most westerly point presented the same characteristics as those off Alexander Land and Charcot Land, and he is led therefrom to believe that land lies not far to the south, and that with clear weather they might have seen it in places. On Jan. 22, 1910, in about  $70^{\circ} \text{ S. lat.}$  and  $122^{\circ} \text{ W. long.}$ , the *Pourquoi Pas?* was blocked by pack ice extending northward from proceeding further west, and as some of the crew were sick and the coal was running short, Charcot turned homewards and entered the Straits of Magellan on Feb. 1, 1910.

Charcot's expeditions are in the very forefront of leading Antarctic explorations. No one has surpassed him and few have equalled him as a leader or a scientific observer. He is absolutely impartial and accurate. When he started, little was known of the western coast of northern West Antarctica except the Gerlache Strait region and a couple of rather vague landfalls further south. Now this coast is practically surveyed from Liège Island in  $64^{\circ} \text{ S. lat.}$  to Charcot Land in  $70^{\circ} \text{ S. lat.}$  One of Charcot's most important discoveries is that of safe harbors at Wandel Island and Petermann Island, as these are available for bases and rallying points for future expeditions.

The geology and general appearance of this land are now fairly

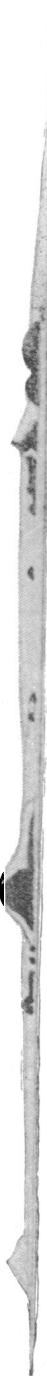


FIG. 4—Alexander Land as seen from the north.

well known. Everywhere there are mountains and rocky heights and except at a few favored spots, the shore consists of a wall of ice from 30 to 50 meters in height, from which the tabular bergs calve off. The inland ice or ice cap which rises from the shores of King Oscar Land and Foyen Land is invisible from the west coast, where only mountains and other mountains behind, with glaciers streaming down between, are in sight. The west coast is evidently not unlike the ocean coast of Norway, with its abrupt high cliffs and sharp peaks, a comparison already published in 1622, which proves that one traveller at least, probably Don Gabriel de Castiglion in 1603, had been in West Antarctica before that time.

That the mainland of West Antarctica also extends up to the Great Ice Barrier and includes King Edward Land is now withdrawn from the realm of surmise towards something like certainty, thanks to de Gerlache's and Charcot's soundings. This cannot be laid down positively as yet, but the indications certainly point that way. Whether or how West Antarctica connects with the great mountain range of East Antarctica, which Shackleton saw vanishing into the unknown, however, is still one of the geographical problems of the future.

Many new scientific facts were garnered by the various members of the staff, but are not worked out as yet. Among these may be specially mentioned some of the tidal observations of Godfroy, which agree perfectly with the theory of the tides of Lord Kelvin; the collecting by Gain of much plankton, of numerous cryptogams, algæ, phanerogams, and of some cultures of green snow; and the preparation by Liouville of many zoological and anatomical specimens which, especially in the line of embryology, have never before been seen by any naturalist.

Whether Charcot and France will take any further part in the exploration of Antarctica remains to be seen. Let us hope so! The *Pourquoi Pas?* is available and the unknown still looms large on the map. But whatever the future, knowledge and science have been widened by the splendid efforts of the Frenchmen who, with Charcot at their head, have explored the Antarctic.